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VOLUME 2 NUMBER 2

NOVEMBER 1944

Exhaust

ON the opposite page we have reprinted a letter which was addressed to all personnel in the British R.E.M.E. Corps. In it, the D.M.E. has passed on a message of commendation and praise from the "Invasion Commands" to the British Corps for their pre "D"-day efforts of preparatory engineering and maintenance.

This amounts to another honourable credit to the reputation being rapidly garnered by this new corps.

Long before "D"-day, R.E.M.E. was setting a high example to its younger Canadian counterpart. Since "D"-day it has continued to hold to that standard.

Meanwhile, the press and radio will record in tactical detail the Canadian Army's progress and adventure in Western Europe. It will not likely record in detail its technical adventure, since that is not exciting news—it pays no apparent contribution to the headlines of the day.



But the contribution is there, for without the continuous maintenance and repair of equipment carried out by those "up front", the L.A.Ds.—the Mobile Workshops—and in fact all the way back to the big Base Workshops—our fast-moving, fast-shooting armies would grind to a stop.

Let us have no illusions about the end of the war. We have a big job still to do and it will require all our skill and knowledge. This is the time for each and everyone of us to put forward that extra effort, not only to finish off the last round in knockout fashion, but to ensure that everything we do upholds that high standard of efficiency which has been so ably set by our compatriots of R.E.M.E.



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CAM is published monthly in the interests of Mechanical Maintenance, and directed to the non-commissioned officers and men of the Canadian Army.

Your contributions of articles and ideas are welcome. Address all correspondence to the Editor, CAM, Directorate of Mechanical Engineering, Department of National Defence, Ottawa.

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The following letter was issued directly after 'D' day by D.M.E. to D.Ds.M.E. Commands etc. and Cs.E.M.E. Workshop Groups,

"Now that the Operations of 21 Army Group on the Continent of Europe have started and have resulted in the firm establishment of a bridgehead covering 600 square miles or more of territory, I am able to let all ranks of the Royal Electrical and Mechanical Engineers, in the United Kingdom, know the results of the enormous efforts which they made in the preparation of the force and in its launching.

Firstly, the equipment issued to the Army Group was the most complete and fully modified outfit that any British force has ever received. Nothing except sheer lack of parts or material stopped modifications being 100% complete on every vehicle, tank and gun. Certainly no withholding by the R.E.M.E. of the necessary effort in men and hours of work lessened the achievement.

Secondly, the move of the forces from the concentration areas to the marshalling and finally the embarkation areas was marked by perfect integration of the recovery and repair organization with the movement organization. You all know that the personnel manning these posts were nearly all drawn from static workshops up and down the country and were by no means used to the peculiar and arduous conditions under which they have been living and working

during the past 3 to 8 weeks.

Great satisfaction has been expressed by the Area Commanders with the work of the Corps and not only this but also with the bearing and smartness of the Corps. On an average 6% of the vehicles comprising unit equipment passed through R.E.M.E. hands through mechanical troubles and 4.5% were returned to units in time to embark, the balance being made up from reserve vehicle parks.

Thirdly, the waterproofing of the Army Group has been a triumphant success. Without going into detailed figures, reports from NORMANDY indicate that the losses between craft and shore through waterproofing or bad driving, were more than 10 times less than have been anticipated. Much of the work of actual waterproofing was, of course, carried out by unit personnel, but a vast amount was done by the R.E.M.E. not only in the assault and follow up forces, but in the case of 100% of the reserve vehicles. The bulk of this new and difficult work has been well done as is evidenced by the results and the checking of waterproofing and the general assistance rendered to units in this matter in the concentration, assembly and embarkation areas, has been generously recognized by them. The whole of the technical co-ordination, trials, vetting of instruction books for 'A' vehicles and production of instruction books for 'A' vehicles and of instruction cards for 'B' vehicles and guns, etc. has been the work of the R.E.M.E.

As a result of all these efforts,

D.M.E. 21 Army Group and I have received messages of commendation for the work of the R.E.M.E. from Commander, 2nd Army, from the Area Commanders in the "Invasion Commands" and unofficially from S.H.A.E.F. I need not tell you what satisfaction this has given to me, but I would take this opportunity of telling you that it reflects the highest credit on every officer, W.O., N.C.O., craftsmen and auxiliary and on every civilian worker, man and woman, who has contributed in any way to the result achieved—and all have contributed in some sense, either taking direct part in this mounting operation or by shouldering the additional burden left by the departure of large numbers of their comrades for the "Invasion Commands" or by bearing a share in the technical co-ordination and preparation of our schemes. Their work has had a direct bearing on the success of the initial landings. It has contributed substantially to the decisive gains of the initial stage of the invasion, and it is an indication of what we will do in the days to come when the heavy maintenance load from the other side starts to make itself felt in our 4th Echelon Shops at home.

I never had any doubts of the outcome of our efforts during the past month, even though it was by no means always set fair. I have no doubt of the results of our efforts in the months to come.

"Well done the R.E.M.E. in the U.K., keep it up and more power to your elbows in the days ahead."

Vacuum Power Boosters

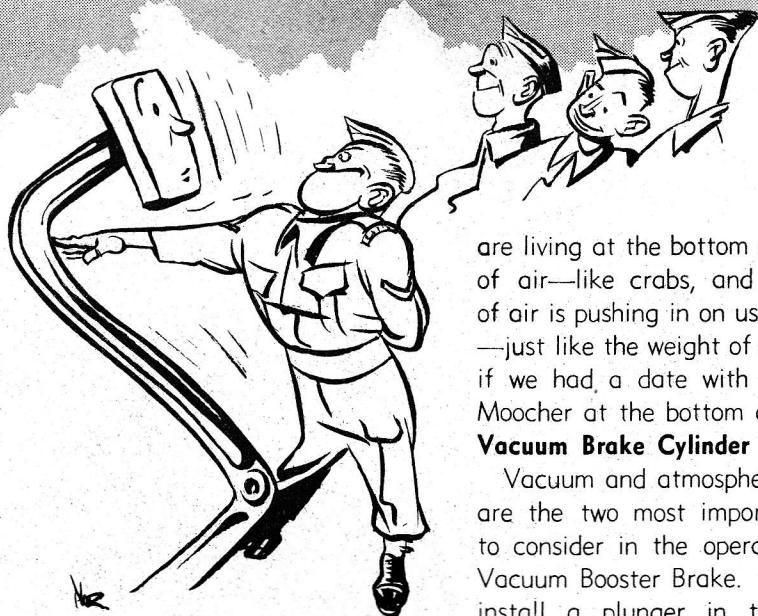
THE TOUGH LITTLE GUY
THAT PUTS ON THE PRES-
SURE FOR YOU — HERE'S
HOW HE OPERATES.

THE day may not be far off when you'll have to learn how to drive all over again. Don't you believe us? Well, suppose pleasure cars in the future have no clutch pedal—no brake pedal—no steering wheel—just a row of buttons to press. Wouldn't you need a set of instructions to tell you what to do with your spare time? In the meantime though—don't worry about it. You still have a lot of levers to make driving interesting—and the brake pedal is one of them.

Driving to-day isn't like it used to be though, you don't have to be an athlete to drive staff cars, jeeps or even the heaviest of trucks. You don't have to use every ounce of your strength to apply the brakes. A sweet, frail, young C.W.A.C. can stop a 6 x 6 just as fast as a brawny 200 pounder.

Why? Because the Army Vehicles are equipped with such things as hydraulic brakes—Vacuum Booster brakes and Hydrovacs. These things help to make easier, safer driving—but every good mechanic knows they have to be kept in proper working order if you want them to supply the energy it takes to stop the vehicle.

We unravelled a yarn in September CAM about how **hydraulic** brakes did away with brake rods—levers and linkage—and how they supplied a mechanical advantage. Hydraulic systems are O.K. on light



vehicles—but they don't supply enough mechanical advantage to put the whoa-up on the big babies. That's why Vacuum Power Boosters were born.

Vacuum—What's That?

Some people say it's nothing . . . Some say it's something that ain't there . . . Others don't know. Our well thumbed edition of Webster tells us, "Vacuum is a space from which all, or nearly all the air has been removed." That's good enough for us. To give you an inside view of the situation—look at the vacuum in Fig. 1.

What's Atmospheric Pressure?

If you aren't the nature loving type you may not think that air weighs very much—but it does. Let's imagine the air around the earth is water (If you're on the coast you won't have to stretch your imagination a great deal). In other words, we

are living at the bottom of an ocean of air—like crabs, and the weight of air is pushing in on us on all sides—just like the weight of water would if we had a date with Minnie the Moocher at the bottom of the sea.

Vacuum Brake Cylinder

Vacuum and atmospheric pressure are the two most important things to consider in the operation of the Vacuum Booster Brake. Suppose we install a plunger in the cylinder shown in Fig. 1—then it would look something like the innards of an actual Booster Brake cylinder. You'll see what we mean if you look at Fig. 2.

How Much Does Air Weigh?

The weight of air at sea level exerts a pressure of approximately 15 pounds per square inch. If the size of a glass window is 30" by 30" it would have a surface of 900 square inches. There'd be 900 x 15 pounds of air pushing on the glass. After several minutes of careful calculating we figured that to be 13,500 pounds pressure, Humm—we must have made a mistake, the glass wouldn't stand that much pressure. No—we were right the first time. The glass won't bend or break because there's equal pressure on both sides of it—but if you create a vacuum on one side—stand clear. (This has nothing to do with vacuum brakes—but we hear somebody has invented a glass that **will** bend. Looks like one of these days the

Sarge will be able to wring out his bottles).

With a few more additions to our cylinder we can make it look closer yet to the Vacuum Booster Brake Cylinder. Look at Fig. 3 and you'll see what we've added.

Of course nothing quite so simple as this would do in actual practice. We've got to have a valve which will allow the air to enter one side of the cylinder at just the right time. The right time is when we push down on the brake pedal. A special type of

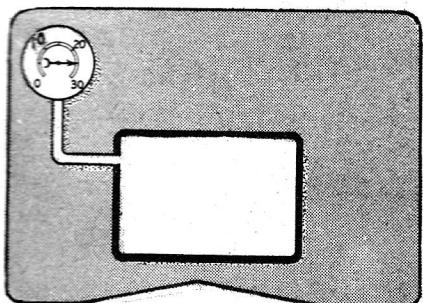
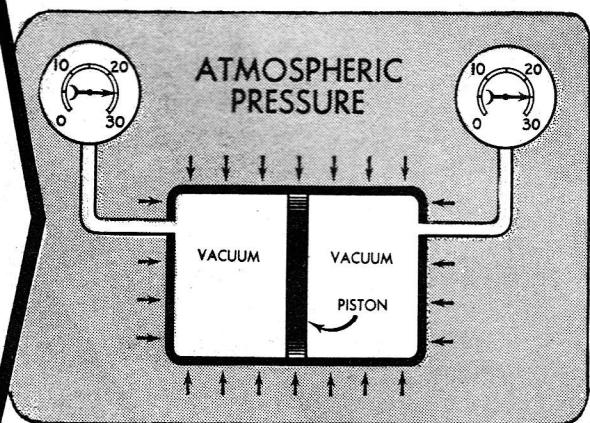


Fig. 1. Here's a metal cylinder with a vacuum gauge connected to one end of it. The air has been taken out of the tank—leaving a vacuum. The shaded portion surrounding the cylinder represents air.

valve then—is installed in place of the hole we punched and is connected by levers to the brake pedal. It's a special kind because it includes a diaphragm in addition to the valve. The reason for this fancy arrangement is to control the pressure applied by the booster when we only want to partly apply the brakes to slow down the vehicle.

When the brakes are not in use—both sides of the cylinder are open to vacuum. When the brakes are applied—the valve allows atmospheric pressure (air) in one side of the cylinder. When the brake pedal is depressed slightly and then held part way down—the valve allows

Fig. 2.—With vacuum on both sides of the piston we can say the piston is suspended in Vacuum. A dill pickle in your beer will give you the same effect. The equal pressure on all sides of the pickle will suspend it in the beer.



some air to enter the cylinder—then both the air and the vacuum is shut off with the help of the diaphragm. Clear as mud isn't it? Well don't worry too much about how this valve business operates—the main thing to know is how to keep it in perfect operating condition. Fig. 4 however, shows the whole unit—valve and all.

Just keep in mind—the vacuum booster is only there to assist the driver to apply the brakes. If something goes wrong with it the brakes can still be operated and if your

foot is heavy enough—you'll still be able to stop the vehicle. The brake pedal is connected to both the booster and the hydraulic master cylinder. The intake manifold is connected to the booster cylinder so the pumping action of the engine pistons create the vacuum. There's a small check valve in this line and if the engine happens to stall, enough vacuum will be trapped in the reserve tank to give at least one satisfactory application of the brakes.

Somehow or other the Booster gets

Here's a reminder just so you'll know what kind of P.M. your booster brakes need to keep 'em on the job.

◆ The vacuum power cylinder should be kept clean on the outside.

◆ The rubber boot should be kept clean—free from oil—and replaced if it's torn or damaged.

◆ All hose clamps and pipe fittings have got to be tight.

◆ The air cleaner is just like all air cleaners—its job is to collect dirt—your job is to keep dirt out of it.

◆ The operating valve and the check valve have to be clean too—your manual will tell you how to do the job on the different types.

◆ Lubrication—yes—the unit has to be oiled. The piston in the booster cylinder needs lubrication and so does the linkage. There's special instructions for different vehicles regarding the kind of oil and how to get it in the right places—so go check your manual.

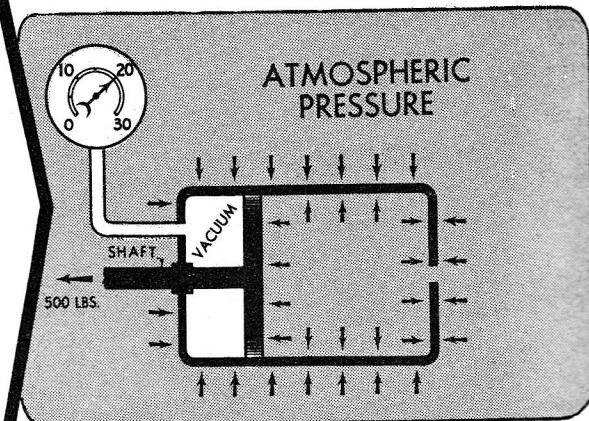
The above Preventive Maintenance should be done at least every 5000 miles—and more often than that in dusty country.

a lot of blame for poor brake operation. Maybe it's because it's the part of the brake system that's the easiest to yank off. Maybe it's because its function is not understood or it could be because it's often neglected until it develops a bad case of non-operation. Anyway—if you look after it and give it the necessary P.M.—it won't give you much cause for worry. If you suspect it's giving trouble—a little bit of checking in the right places will soon tell the story.

To find out in a hurry whether the booster is haywire or not—all you have to do is assume a comfortable position in the drivers seat. With the engine stopped and with the third toe on your left foot—make a light application of the brakes. **Hold the brake pedal in that position** and start the engine. As soon as the engine starts, the brake pedal should move further down on its own accord. If it doesn't—you know right then and there the booster isn't boosting. If the pedal does go down when the engine starts—you can skip the booster and look for trouble somewhere else in the brake system.

There's just a chance you'll run into a job where the brakes will go

Fig. 3. If the piston has a diameter of 8 inches (approximate area 50 square inches) with normal engine vacuum on one side of the piston atmospheric pressure will enter the hole we punched and create a pressure of about 500 pounds on the piston.



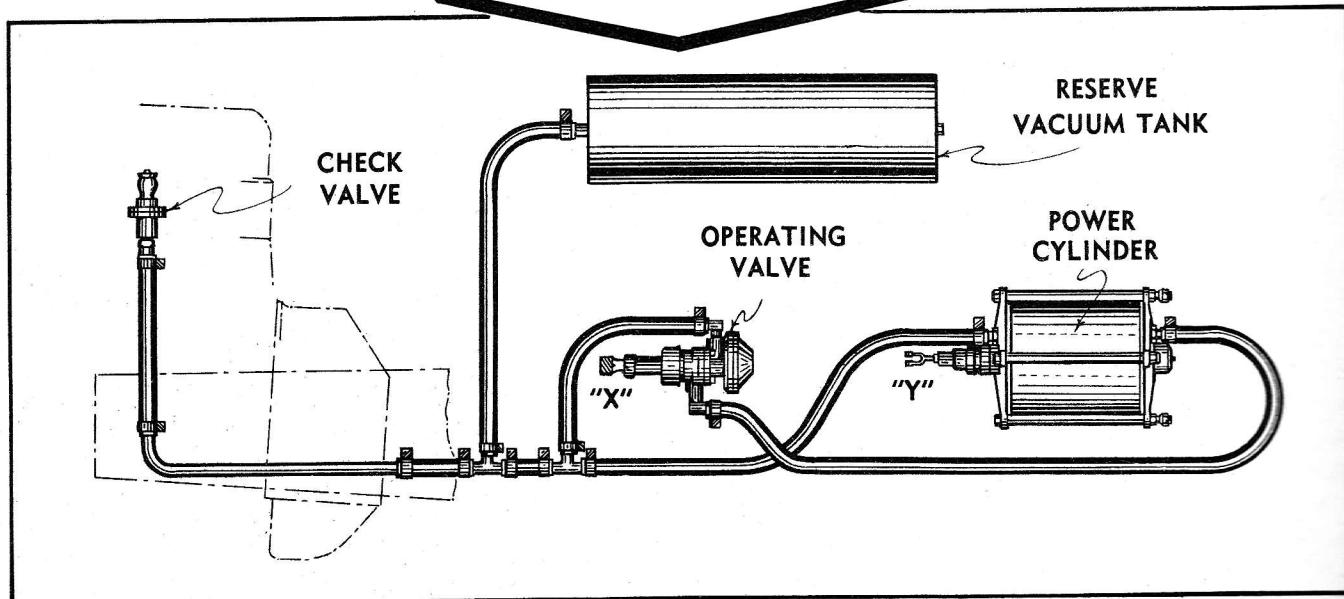
on O.K. but won't release. Any mechanical hep-cat knows this trouble might be caused by trouble in the hydraulic system. It could also be due to bugs in the booster system which is an easy matter to check.

All you have to do is disconnect the booster vacuum line where it enters the intake manifold. This

takes the booster out of the system. You'll have to plug the hole in the manifold so the engine will run. After you've plugged this hole—start the engine and try the brakes. If they release now—the trouble must be in the booster. If they don't release—the grief must be somewhere else.

If one of your vices happens to be smoking, you'll know how hard it is to get a decent smoke out of a cigarette with a hole in it. A leak in any part of the vacuum booster system is just as bad. If there's a leak in the lines or the reserve tank—you won't get much assist from the vacuum assist. It's not much of a

Fig. 4. Here's the whole shebang not counting the levers and linkage. "X" marks the spot where the brake pedal is linked to the operating valve. "Y" is where the power cylinder is linked to the hydraulic master cylinder.

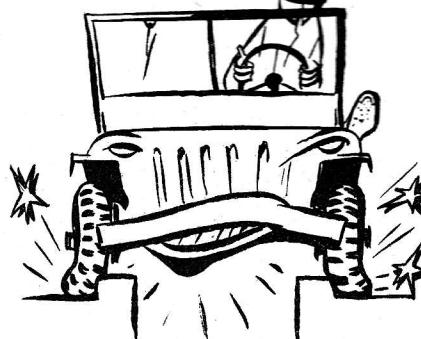


Pitfall for Jeeps

ME? Dey call me Hoiby, dat's da short for Hoibert. To-day I'm a very unhappy guy cause I'm in da digger. It's not because I'm stupid—don't tink dat—it's just on account of da Sarge. He don't understand me. I'll exaggerate to you wot' I mean.

I'm a guy wot' does me woik widout complainin' see—I'm on da ball and I'm wise to all da tricks. I know how to do da woik da easy way. De udder guys, dey got to ask questions but I don't—see—I jist go ahead and get me woik done widout askin' nobody.

Yesterday I'm goin' on wid me regular duties, greasin' a jeep. Dat's me job—greasin'. Well dere I was—puttin' da jeep on da pit—not havin' any trouble see—but jist like I do all a time. Sure, I know da pit is a snug fit for jeeps—but I know how to get 'em on. I figgered it out a long time ago. Da two coibs on da sides are too far apart for da wheels by about an inch, but dat don't make no difference. A guy like me can figger a ting like dat out easy. I jist puts da jeep in four



wheel drive—den I drives it on in low gear. Like I says—it's a tight squeeze—but I make it every time.

Well yesterday—just as I was squeezin' a jeep on da pit who comes along but da new sarge. He jist stands dere wid his hands on his hips and watches til' I got 'er on nice an snug. I look at him grinnin' an tinkin' I done a swell job den I seen him comin' t'wards me all red in da face an his eyes flashin'. He grabs me by da collar an holds me up like he was showin' off a duck—den he lays it into me.

He tells me dat when I force da jeep on da pit like dat, I do all sorts of tings. I scuff da tires, I strain da wheel bearings, I bend da steering and throw out da camber (wot-

ever dat is). I tell him I been doing it for monts and ain't had no trouble an when I say dat he lets go me collar an drops me right in da pit. Den he points a finger at me an sez I should've told him or somebody before.

I guess dat's when I loses me head for I takes da lube gun I happens to be sittin' on and points it at da sarge. How did I know da ting was so full of grease when I pulled da trigger? Anyway—here I am in da digger.

One of da boys was in to see me dis morning and he told me dey had been woiking on da grease pit all yesterday afternoon. Da sarge had 'em chisel bout an inch of cement off da outside of each coib. Den he mixes a couple a handfulls of cement and plasters it on the rough edges so the tires won't be cut. Now da boys say da jeeps fit on da pit just like all de odder jobs.

I guess da sarge knows his business alrite so if any of you odder guys are havin' trouble wid your grease pits you better see about it or you might land in da same perdicament I'm in.

Anyway fellers—take it from a guy wot's in da know—don't go pointin' grease guns at your sarge like I done because dey might be loaded. I mean of course—da sarge.

x * z

proposition to check this however, providing you have a vacuum gauge.

Here's what you do—

If there's a pipe plug in the rear end of the booster cylinder remove it and connect the vacuum gauge to this hole. If there's no pipe plug—disconnect the vacuum hose at the booster cylinder and connect your vacuum gauge to this end of the hose.

Now—start the engine and you should get a reading of 18 to 20 inches with the engine idling. If

you don't get this reading—that's bad—you'll have to look for the leak. When you stop the engine—the vacuum gauge should hold the reading 18 to 20 inches for at least fifteen minutes. If it doesn't hold it—the check valve between the intake manifold and booster cylinder may be leaking. If the check valve leaks you won't have any reserve vacuum when the engine stalls—so check the check valve.

These are some simple but important adjustments you have to make on different vehicles. We can't tell

you the whole story now, so in the meantime—

The only way to do when you find it's necessary to check or alter the adjustments of the linkage and valves is to beg—borrow—or steal a manual for the vehicle you happen to be working on. The manual will give you all the specifications plus pretty pictures to make the job easier. Don't tinker with brakes—they've got to work just right and guessing at adjustments on them is a quick way to kill somebody.

x * z

Distributor Points

The distributors' got more points than meet the eye. Apart from the ones you use a file on, here's a few more to file away in your little black book entitled "How the distributor gets that way".

Some experts say the battery is the heart of the engine—some say the distributor—which ever it is, we do know the distributor does a heap of work and the engine won't run worth a damn without it.

It does three jobs. It operates the coil—thus making little voltages into big ones. Between the two of them they transform a battery voltage of (6 or 12 volts) into 10,000 to 20,000 volts so the current will jump the spark plug gaps. The second duty of the distributor is to hand out this high tension spark to the various spark plugs.

And it also looks after the timing of this spark for different engine speeds. As part of its anatomy in helping it to do these things are centrifugal governors and vacuum advance mechanisms. They all have to operate right on the nose

Fig. 1. This is the inside dope on how the ignition system transforms the battery voltage to ten or twenty thousand volts and distributes it to the spark plugs.

the distributor points are closed, current can flow from the battery, through the coil, through the distributor points and back to the battery.

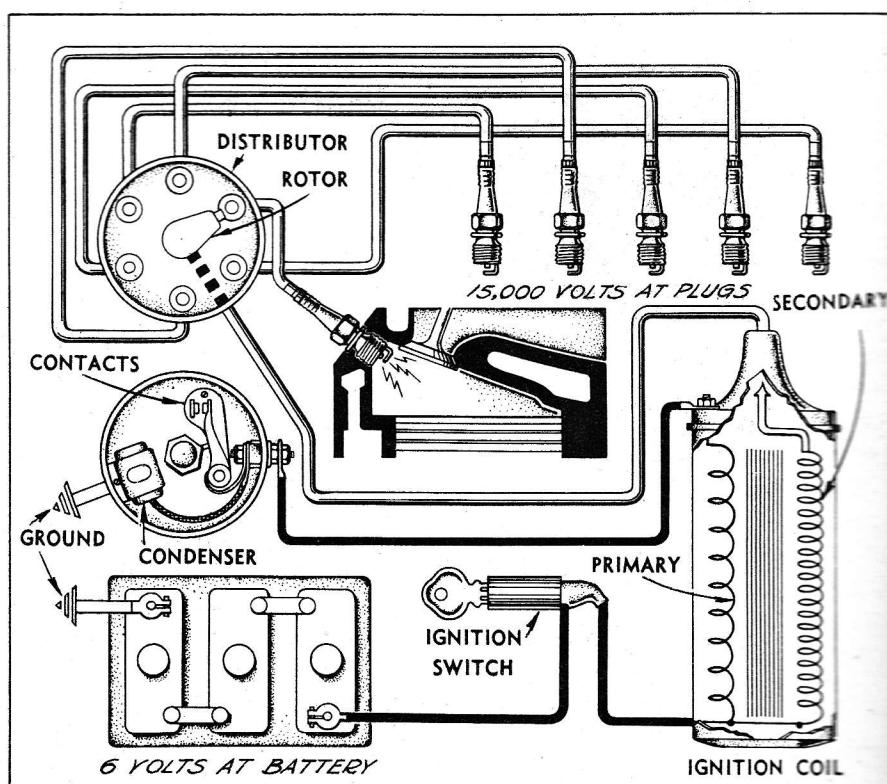
CONTACT POINTS ARE A SWITCH

Just like a light switch or any other kind of a switch—when the distributor contacts separate—the current stops flowing. The only difference between the contact points and the ignition switch is—the contact points open and close automatically. One good reason why they are automatic—and why they've got to be treated right is because at 50 miles an hour they have to open and close about 120 times a second. The points are pushed open by the cam lobes and are closed by the contact spring tension.

COIL OPERATION

The coil is the baby that puts the oomph behind the high tension current—it's a transformer.

When the contact points are closed and current is flowing through



the primary winding in the coil—the coil is filled up with magnetism. It takes a definite amount of time to load the coil—just like it does to fill a glass with water (if your ration is used up). The points must be adjusted so they will open at the moment the coil is full. Using electrical lingo we would say the coil was saturated instead of full.

At this moment one of the lobes of the distributor cam pushes the contacts open and the primary current stops flowing—then wham—the coil unloads a hefty high tension spark through the high tension wire to the distributor rotor. The rotor—being keyed to the distributor shaft passes this high tension spark to the segments inside the distributor cap. From there it goes to the correct spark plug at the correct time.

CONTACT ADJUSTMENT

Like we said—when the points are closed and current is flowing through them—the coil is being loaded. If the points aren't adjusted properly the high tension spark will be weak. Here's why. If the points aren't closed long enough—the coil won't be fully loaded. If the points remain closed too long the coil will be overloaded and will heat up. Too much or too little then gives you a weak spark. The best way to adjust the points is by using the cam-angle method—(see July Cam No. 10 page 177). The next best method is by measuring the point gap. In any case—the manufacturers specifications should be stuck to—no guesswork when the points are concerned.

THE CONDENSER

What about that little animal called the condenser? Well—the condenser is just like a shock absorber—it absorbs the shock when the points open. When any switch breaks a circuit—the current tries to keep flowing across the switch. You can actually see this happen in some switches if the voltage is high

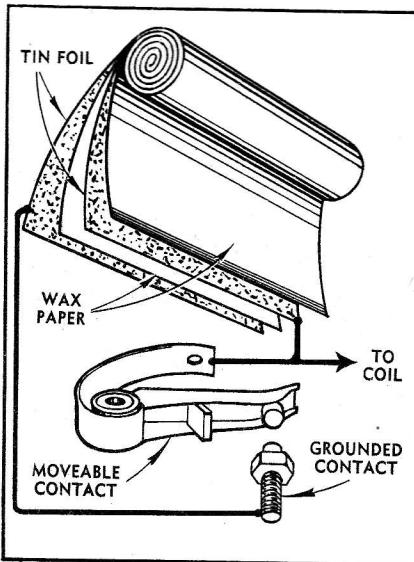


Fig. 2. Here is how the condenser is connected to each of the two contact points. In an actual condenser the two strips of tin foil are several feet long and are rolled up with the wax paper and enclosed in a metal case. Next time you get a bum condenser—open it up and see for yourself.

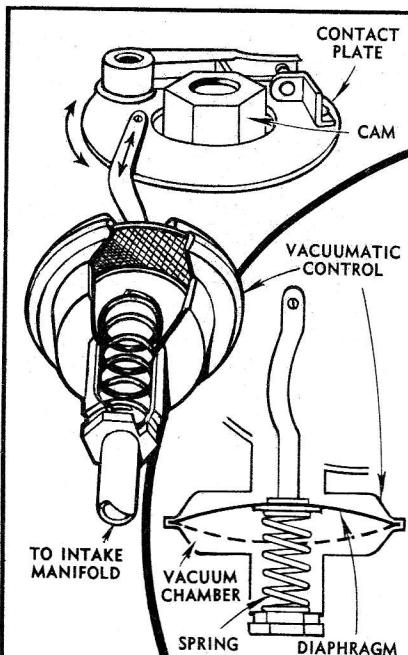


Fig. 3. This is how the vacuumatic spark control uses manifold vacuum to move the contact points in relation to the distributor cam. When the vacuum is high the spark is advanced—when the vacuum is low the spark is retarded.

enough. The moment you open a switch and see a flash or arc of electricity it's because the current is trying to keep on flowing. In the case of the distributor points the same thing happens. The voltage in the circuit has been built up to about 350 volts in the primary winding of the ignition coil and when the points open—they arc. If the points were allowed to arc all the time, the points would soon burn and wouldn't make a good contact. That would mean the coil couldn't be energized properly. To overcome the arcing at the contact points a condenser is installed.

The condenser consists of two pieces of tin foil separated from each other by a thin piece of wax paper. It's connected to the distributor points so that one strip of tin foil is attached to ground and the other strip of tin foil is connected to the movable contact arm. Electricity does many funny things, some of which are difficult to explain but if you'll take our word for it—you'll have a rough idea of what happens inside the condenser. When the contact points in the distributor separate—instead of the current trying to arc across the points—it flows into one of the strips of tin foil in the condenser. In other words—the strip of tin foil acts like a reservoir and protects the points when they open.

The condenser stores the current for a fraction of a split second (1/12,000 of a second approximately) then discharges through the coil which helps to create a healthy high tension spark.

You can see how the contact points would be continually getting the hot foot if it wasn't for the condenser. It isn't practical to repair condensers although sometimes—if you're really stuck—you can get a few more miles of life out of a condenser by tapping several very shallow dents on the outside of

the case. Don't depend on this remedy though because it doesn't always work. Another thing that might help you out if you're stuck is the radio condenser which is attached to the generator. Just for the record in your little black book, the size of a condenser isn't measured by its outside dimensions. Instead—a condenser is measured by its capacity which is governed by the size of its plates (the tin foil) and by the thickness of the wax paper. The capacity is built into a condenser and you can't change it. The electrical term used to indicate capacity is the **farad**. The farad is too large a value for use in automotive condensers—just like a "ton" is too large a value when you're buying butter with ration coupons. When speaking of butter we use pounds—when speaking of automotive condensers we use microfarads which is one-millionth of a farad. The average automotive condenser has a capacity of .25 microfarads (1/4 of a microfarad) but this value varies slightly for different makes of vehicles.

What's a farad? O.K. you asked for it. A condenser has a capacity of one farad when a colomb of electricity charges the condenser plates at a pressure difference of one volt—a colomb of electricity being approximately 5,000,000,000,000,000 electrons—which is quite a little gathering). Fig. 2 shows how the internal parts of the condenser are connected to the two distributor contact points.

AUTOMATIC GOVERNOR ADVANCE

This business sits quietly out of sight in the lower part of the distributor housing. Because it's out of sight it's very often out of mind too. Luckily nothing much ever goes wrong with it that can't be cured by a little cleaning. Sometimes it gets gummed up with grease and dirt—but it **should** receive at-

tention before that happens.

When the engine is idling at low speed the spark is timed to fire in the cylinder just before the piston reaches top dead centre. When the engine is speeded up however, the piston speed increases too. Therefore—if you want full power and pep out of your motor you have to make the spark occur earlier. In the days of the Chev 490—and Ford Model "T" you did this by hand—now it's done automatically for you so you won't forget to do it if you happen to be passing a college for girls at the time. When the engine slows down, the spark is retarded—when the engine speeds up it's advanced.

All the mechanism consists of is two weights held by springs. As the distributor shaft speeds up the weights tend to fly out against the tension of the two calibrated springs. Because the distributor cam is attached to these weights—and is not keyed to the distributor drive shaft, when the weights fly out it moves ahead in relation to the distributor drive shaft. As we said before—the cam is what operates the points—therefore you can see what happens. The cam is advanced in relation to the distributor shaft and opens the points earlier than it did at slow speed—resulting in the

spark occurring earlier in the cylinder.

VACUUMATIC ADVANCE

Some distributors have an additional spark control. You've seen this little jigger no doubt on the side of the Plymouth and Chev. distributors. On the Ford it's called the vacuum brake.

The object of this device is to allow a still greater advance of the spark when the engine is operated at part throttle. This additional control of the spark timing increases economy. The Chev. and Chrysler types are similar to each other with the exception of the linkage. You'll find the Chrysler vacuum spark control is linked up to the plate that holds the contact points. This plate is mounted on a ball bearing and is free to rotate several degrees. If this bearing happens to be sloppy or have rough spots—the plate may tip slightly—throwing the contact spacing out.

The G.M.C. vacuum spark control is linked to the distributor housing and when the unit is operating it turns the whole distributor. In both cases the contact points are moved in relation to the distributor cam—whereas in the case of the governor weights—the cam is moved in relation to the points—same difference—the final result is a retarded or advanced spark.

Fig. 3 pictures the details of this unit. Preventive Maintenance consists of making sure the diaphragm isn't punctured and the linkage is free.

The Ford type—the vacuum brake—is a little different. It consists of a small piston with a little chunk of leather on one end of it. A spring holds the piston in contact with the edge of the plate on the governor spark control. The pressure of the leather on the plate acts like a brake and slows down or holds back the governor advance mechanism. Like the Chrysler and G.M. dis-

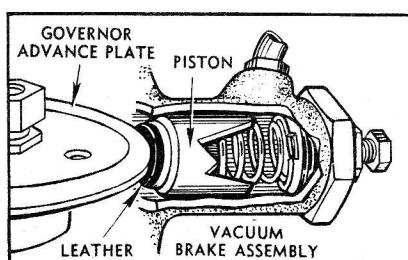


Fig. 4. The little piston can slide up and down the cylinder. The spring tension holds the leather in contact with the edge of the advance plate when the vacuum is low. When the vacuum is high the piston moves away from the plate and the spring is compressed.

Scatterquins

Shotguns used for training purposes are fragile—they've got to be treated as such.

"**A**W yer nuts, these things are only good for weddings and shooting ducks, they ain't dangerous to humans", says Cpl. Kizel to me only yesterday when I reprimanded him sharply for monkeying with a shotgun that happens to be lying on my desk. Now this Kizel is a very nosy annoying person and besides, this is no way for one gentleman to address another gentleman. But I am a peace loving character so I don't take offence and instead explain to him why he is such a damn fool.

"If I am smart," I say to Kizel, "I will let you play with these things to your hearts content and will soon be rid of your annoying presence, but I'm not smart and besides I don't like going to funerals. These things are designed for John Q Public and therefore must meet requirements which are greatly different from those of the army. John Q has to buy his own ammunition and doesn't want to waste it by blowing other peoples heads off, or his own. Because of this fact shotguns aren't loaded down with a great quantity of safety features like are



found on military arms. The average shotgun has a safety catch. The safety catch locks the trigger or triggers so when they are pulled the hammer won't be released. But it doesn't **lock** the hammer back, therefore, if the gun is given rough treatment—the hammer might be jarred free of the sear with disastrous consequences to anything in front of the muzzle if the gun is loaded. For this reason, a seasoned shotgun user will not put a cartridge in the chamber until just before he requires to use it and will always unload his gun if he doesn't use it immediately."

Kizel's large purple eyes are gazing at me in open admiration so I quickly warm to my subject and continue forthwith. "The charge fired by a shotgun is not only very deadly to humans but is also very messy because at fairly short ranges it will blow a man's head almost completely off. At longer ranges it will kill in almost as untidy a manner. With the 7½ gauge shot issued in the military cartridge, a shotgun can

DISTRIBUTOR POINTS—

tributors—this unit is connected by a pipe to the intake manifold. Here's how they all operate.

When the engine is being operated at part throttle—(medium speed and light load) the engine vacuum operates the spark control—overcoming the tension of the spring and allows the spark to advance.

Regardless of the make of vehicle—the spring in the vacuum spark control unit is calibrated and should not be stretched. In the case of the Ford vacuum brake there's an external adjustment for the tension of the spring. We'll shoot you some more info on this adjustment in another article. In the meantime you can see what this vacuum brake

kill at fifty yards and is dangerous at considerably longer ranges."

"Wilbur Manonthestreet, unlike the army, is lazy. (ahem). When he goes shooting he doesn't like to carry field artillery. He likes the fire-power of field artillery however—sooo—shotguns are made light at the expense of ruggedness. Every shotgun should be engraved, **Fragile**—**Handle With Care** because they won't take the punishment that military equipment takes in every day use. Fer gawds sake Kizel, when and if you use a military shotgun, treat it as if you had just paid the hundred odd bucks it would cost you in the local hardware emporium".

"When the army designs equipment, the fact that repairs in the field will be necessary is taken into consideration and the equipment is therefore made simple and easily repairable. (??? Ed.) With shotguns designed for the peace time shooter and repairs in warm comfortable gunsmith's shops—the picture is entirely different. Every breakage that occurs so easily to a shotgun uses up hours of the armourers time which could be spent more profitably in the maintenance of tactically more important equipment".

"So next time you see a scatter-brained individual handling a scattergun like he does his No. 4 rifle Kizel, do what your warped soul always longs to do. Boot him so hard he'll be sitting on his shoulder blades the rest of his life".

x y z

consists of if you look at Fig. 4.

Now we've pointed out that a distribution has more points than Aunt Fanny's prize cactus—we'll haul off and point out the points to watch when overhauling 'em—(Hey! this issue only has twenty pages! ED)—er—next month fellers.

x y z

Accident



IF YOU KNEW WHAT A DARN NUISANCE
IT IS TO FILL OUT AN ACCIDENT REPORT,
YOU'D TAKE CARE TO SEE THAT YOU
NEVER GET INTO AN ACCIDENT.

SURE—sure—like a lot of other things, you make up your mind not to have one yet maybe one day you'll find one right in your lap. If you know the ropes it'll be much easier for you. A properly filled report will go a long way in keeping **your** story straight. Hey! don't go away. No good waiting till you have an accident to learn the ropes. You won't have time.

There's a mistaken idea in some noggins as to what an accident is. Accidents come in all shapes and sizes. The loudness of the bang, the extent of the damage have nothing to do with the first thing that you do—that's **STOP**. It doesn't matter how much damage is done—anything that causes the slightest injury to any person or any animal, or damages anything at all is an accident.

If the presence of your vehicle had anything to do with it—always stop.

Now turn your engine off to prevent fire and see that the engines of any other vehicles involved are turned off, even if you have to do it yourself.

After an accident the vehicles in it are frequently in dangerous positions. Often a crowd collects in the road. Many times this has caused more accidents when another vehicle has crashed into the wreck or people.

To prevent this, post a guard at once to warn all other traffic. If civil or military police are handy they will usually handle this job.

DEPARTMENT OF NATIONAL DEFENCE

Driver's Report of Vehicle Accident, Property Damage, Collision, Theft, Fire

28. 1. Date of accident November 1st 1944 at 2200 hours
 29. 2. Occurred at Atkin & Talford St, City Dobville, Province Ontario
 30. 3. Dept. vehicle number 71-017 Make Chevrolet Type 8-cwt. truck
 17. 4. Speed of Dept. vehicle at time of accident 20 miles per hour.
 18. 5. Condition of brakes good 20. Chains? none
 19. 7. Condition of road dry 21. 8. Visibility clear
 22. 9. If at night; were all front and rear lights turned on at time of accident? yes
 7. 10. Was your vehicle loaded or empty? loaded
 8. 11. If loaded, approximate weight and number of persons carried 1200 lbs.
 and 6 persons.
 32. 12. If unauthorized passengers were carried state names and circumstances None
 23. 13. On what side of the street or road was your vehicle travelling? right
 24. 14. Was your vehicle stationary, moving forward or backward? moving forward
 25. 15. Under what authority was your vehicle being operated? C.A. (B) C. Ingham Camp
 26. 16. What specific duty were you detailed to perform? Transporting passengers from R.R. station to camp
 13. 17. State briefly whether you gave any warning by conventional signs, horn, etc. horn
 31. 18. Describe briefly damage to the Department's vehicle, and give estimate of cost of repair left fender dented, front tire cut \$5.00
 12. 19. Brief description of how the accident occurred other vehicle failed to give right of way
 5. 20. Witnesses:

NAME	ADDRESS	TEL. NO.
<u>J. K. Zoo</u>	<u>999 Queen Street</u>	<u>5-4321</u>
<u>J. Stroblowski</u>	<u>2 Simon Street</u>	<u>0-1199</u>
<u>Constable D. Tracy</u>	<u>Dobville Police Station</u>	

 4. 21. Number of injured persons:

NAME	ADDRESS	TEL. NO.
<u>C. 23142 Pte. Senn J.</u>	<u>139 (B) C. Ingham Camp</u>	
<u>B. 24182 Pte. Smith A.</u>	<u>"</u>	<u>"</u>

 33. 22. Action taken in respect to injured persons First aid with the aid of constable Tracy

Give immediate aid to any who are injured. If more than one person is injured, get assistance in giving first aid if you can. Get the nearest doctor (civil or military) on the scene if injuries are serious—and unless the situation demands it, don't move an injured person till there's someone present who is competent to supervise the job. You might kill him by moving him.

By now you've probably collected the usual crowd—don't let anyone near the vehicles especially if they are smoking. Spilled gasoline and its fumes are highly inflammable and you don't want a fire on your hands too.

Civil laws usually require that the police be called in all cases of motor vehicle accidents—if a policeman doesn't happen to be there, better send someone to call them. While your delegate is on the phone, have him report to your unit commander and give him a brief outline of the situation.

Now the army wants the facts. They want them in order to be fair with you; to protect you, to protect the

army and to be fair to the other people involved. The dope sheet for this is the "Driver's Report of Vehicle Accident, Property Damage, Collision, Theft, Fire"—Form M.F.C. 795—and you should have a couple of them handy in your standing orders folder. Whip them out now and get your information from the others before they leave the scene.

Don't get into any arguments about who's to blame. Just get the facts—you'll get them easier if you are

2

DAMAGE TO PROPERTY OF OTHERS

34. Make of vehicle Maxwell Number of cylinders four Type Sedan
 35. Year of manufacture 1919 Licence number 13-X-7
 1. 25. Name of owner B. Robins Address 22 Read St. Tel. number 0-7420
 2. 26. Name of operator " Address " Tel. number "
 3. 27. Operator's licence number H.P. 973621
 15. 28. On what side of street/road was his vehicle? right hand side
 16. 29. Was it stationary, moving forward or backward? moving forward
 41. 30. Did the operator give you any warning? No
 31. If so, how?
 9. 32. Describe briefly the damage to the vehicle cracked wheel, dented right fender, punctured front tire \$45.00
 10. 33. Describe briefly the damage to property other than the vehicle described in para. 23 above
Hydro-electric pole - N.E. corner Atkin and Fulford Sts. \$15.00
 36. The cost of repairs applicable to para. 32 and/or para. 33 above is estimated by me to be, in the case of para. 32, \$ 45.00; in the case of para. 33 \$ 15.00
 37. 35. Did you discuss the accident with anyone or make any statement with respect thereto? Yes
 38. If so, to whom and to what effect? With constable Tracy who advised me that the other driver was driving too fast and failed to give me the right of way.
 39. Did the operator or occupants of the vehicle described in para. 23 above discuss the accident or make any statement with respect thereto? Yes
 40. 38. If so, to whom and to what effect? He admitted not seeing my vehicle approaching from his right
 41. 39. State whether or not the vehicle described in para. 23 above is insured against public liability and property damage. If so, state the name of the Insurance Company Yes
Prudential Assurance Company of Canada
Head office, Montreal, P.Q.

polite—even if the other fellow was in the wrong and entirely to blame. Keep your shirt on and your nose clean.

Don't give money to anyone—and don't say or write anything that could be taken as an admission that you were at fault. Be cagey. Admit nothing.

You'll notice that your accident report form asks a lot of questions—over forty-five of them. Some are more important than others from the standpoint of

getting the answers while the getting is good. In our picture of the form you'll notice that the questions have been renumbered in writing—that's the best order in which to gather the answers.

The first questions you want answers to are the identities of the other persons involved. You'll get the best results by asking for licence cards or standing orders as the case may be. If it's a civilian ask to see his owner's licence, his driving licence and any insurance card he carries. The best way to do this is to get out your own permit and say, "Here is my identification, sir. May I see yours, please?" Make sure tho' that the description on the licences tie in with the person claiming to own them.

You'll want the names and addresses of any other injured persons—here you might have to use a little discretion. Obviously an unconscious man can't answer questions. Badly injured people should not be disturbed more than necessary. Use your bean. Often you can

3

GENERAL REMARKS

43. 40. How many accidents have you had in the last five years? None
 44. 41. How long have you been driving a Government vehicle? 2 years
 45. 42. Classification as an I.C. operator, class—One, Two, Three class two
 11. 43. Indicate how accident occurred by using one of the following diagrams:

64. Did you report the accident to a police officer? If so, state officer's number, name and address. P.C. 99 D. Tracy Dorvalle Police Station
 42. 45. Remarks not covered by questionnaire, but considered relevant. Civilian approached from my left going at a high rate of speed failed to give me the right of way

1st Nov 1944 *[Signature]* A-76747 Pte. Graham, I.A.
 Signature and rank of Operator of Disputed vehicle

get the information from another passenger or in other ways.

Witnesses are important. Ask them if they **saw** the accident happen. Get their names, addresses, phone numbers if civilians, plus units and numbers if service people by handing them the witness cards (Form MFM 328) that you've kept handy in your standing orders folder. These little cards make this job a lot easier and save you a lot of time—especially if you speak a different language. Make sure you have this information accurately and don't waste time asking them **what** they saw or their opinions. They'll be asked that later. Don't forget to get the name and number of the police officer on the scene.

You can answer question 9 by putting down the damage you **can see** was done to the other person's vehicle. If this other lad claims damage which you cannot see or you don't think was caused by the accident, put it down as **claimed**.

For example, damage you can **see** would be "Front wheels knocked off, front axle bent, right front fender squashed in, cracked windshield".

An example of a statement of damage you cannot see would be "Differential gears ruined by accident." This is the one you'd mark as **claimed**.

Question 10 calls for the same procedure to cover damage to property other than the vehicle above. If a house or building is damaged, get and list the name and address of the owner. If an animal of some kind is injured or killed try and get the name of owner—thus—"Cow—property of Elmer J. Snoggleworth, Snoggle Farm R.R. No. 2, Goon County Ont., Killed".

When you're answering questions 9 and 10 make your own estimate of the cost of repairs—this doesn't have

to be a professional estimate—just your own opinion on what it would cost to fix the damage.

Now that you've answered the questions requiring information from other people, you can fill in the rest of the form without worrying whether they stick around or not. However, you'll want to record the facts about the accident while you're on the spot so that you can get the positions of the vehicles, distances, etc.

So make your diagram now—using the part of the road map sketch supplied that fits the actual layout of the scene of the trouble. If you can't get any part of the printed diagram to fit the scene, draw one of your own on the blank page at the back. Label the streets and show the positions of the vehicles immediately before and after the accident and their direction of travel. Put in dotted lines to show the track of the vehicle or vehicles and the distance of this track from the edge of the road. Then throw in an "X" to mark the spot of impact. Show any important features that might have any bearing on the accident such as a house obstructing the view—or another vehicle's position, width of road, etc.

The other questions can be taken care of now—in about the order suggested by the written figures. On the last one tell **your** story of what happened and cover any points not brought out by any of the other questions. Use an extra sheet or the reverse side if you haven't room in the space provided.

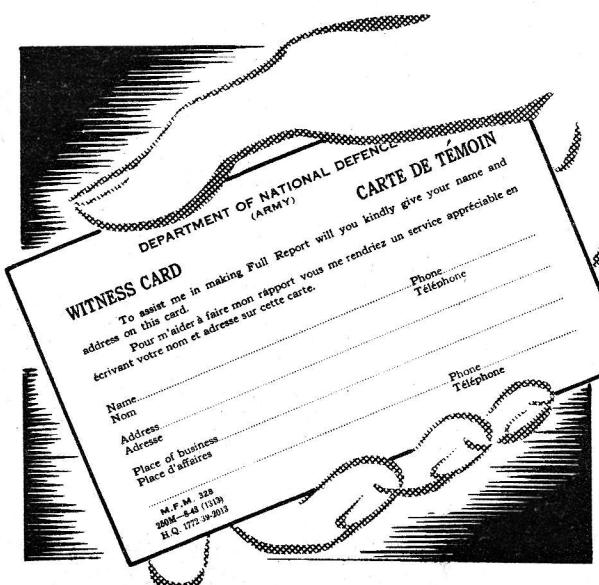
Now comes a very important matter. Complete your C.P.M.S. 1, 2, & 3. Fill in the mileage and briefly put down the details of the accident, particularly in-so-far as they affect the vehicle, under the remarks column. This C.P.M.S. form is important to you. It's your only authority for operating the vehicle and your protection in the event the accident was caused by a mechanical failure in the vehicle.

Right here is a great big reason for you carefully carrying out your C.P.M.S.

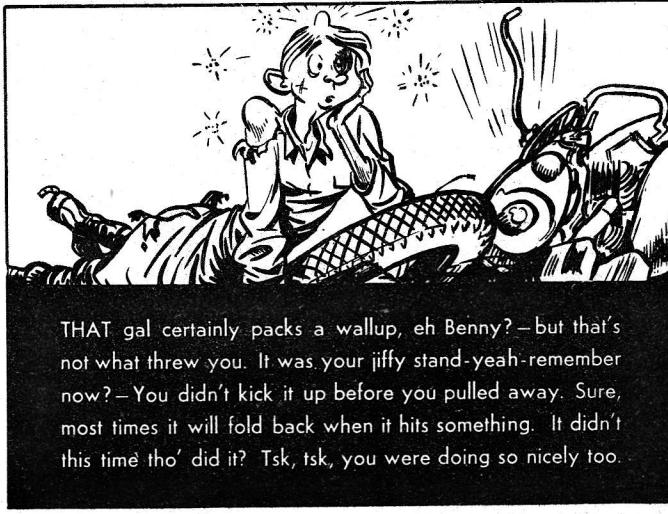
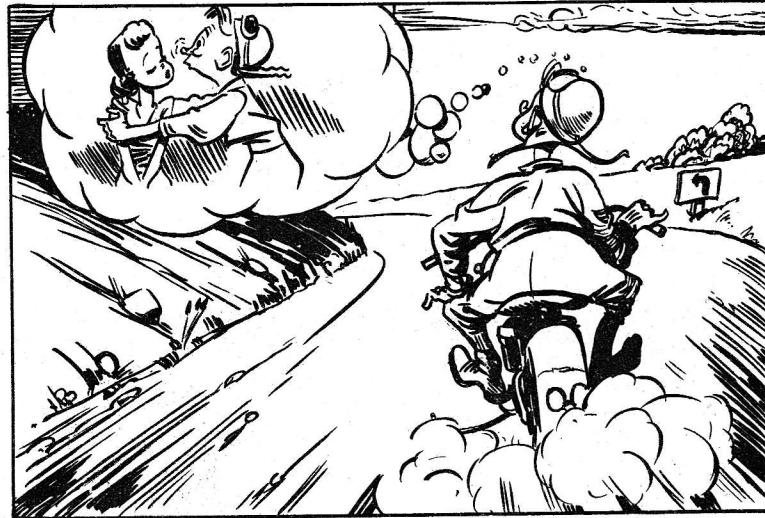
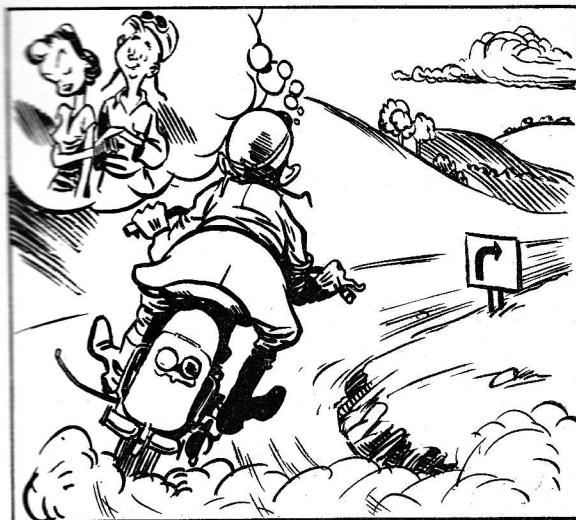
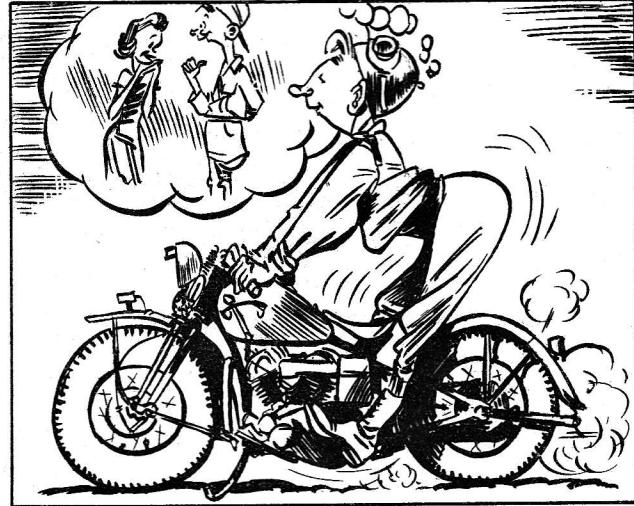
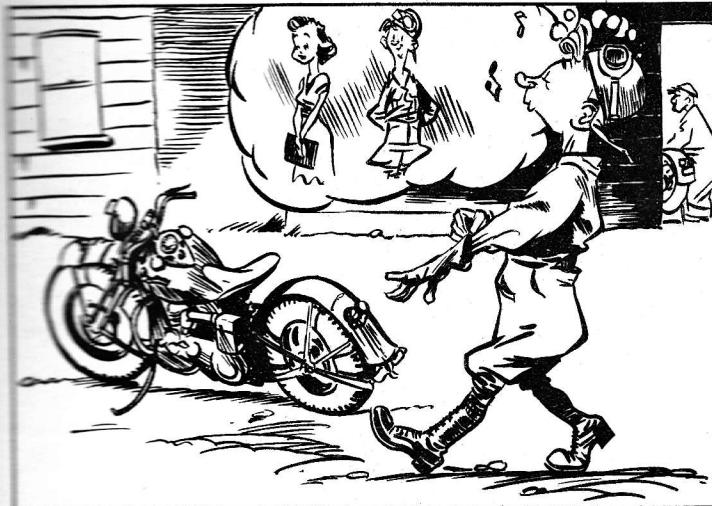
Cases are recorded where the accident has been directly attributed to a mechanical fault that should have been reported on the C.P.M.S. checks. This puts the driver right on the spot and he can be held responsible for the accident **and assessed the cost of repairs**.

Reporting all defects via the C.P.M.S. puts the driver in the clear. That's the most comfortable place to be if you're in on such an affair.

And that about clears up the story on accidents and accident reports. You'll find that by the time you've finished with one, you'll wish you'd never seen the accident—so be smart; don't let accidents come your way. They can cost you hard cash and a lot of grief—and they don't help your standing as a good driver.



The CAM-PAINS... BENNY BOOB



THAT gal certainly packs a wallop, eh Benny? — but that's not what threw you. It was your jiffy stand-yeah-remember now? — You didn't kick it up before you pulled away. Sure, most times it will fold back when it hits something. It didn't this time tho' did it? Tsk, tsk, you were doing so nicely too.

Sarge O'Sweat's Headache and Aspirin

Dept.



Dear O'Sweat:

Can you supply us with any information on how to remove the cell covers of the glass jar type batteries as are used on walkie-talkie equipment. We would also like to receive any information you have on how to service these batteries.

Sgt. R.W.

Dear Sgt. R.W.:

That's easy Sarge, a cold chisel and a hammer will do the job but the trick is to get the cover **on** again. The boys who have all the answers on these babies haven't got an answer to this one, so if you have an old battery you can play around with and find a way to get the cover back on—we'd like to hear about it. Here's a point though—the cases aren't glass. They're made of a composition material called "polystyrene" and in appearance is like celluloid. Original cell covers are sealed on with glyptal cement. The fact remains—the batteries aren't taken apart to be repaired and at the present time go to salvage when they become worn out.

There are a few special instructions however, regarding their servicing while they are all in one piece.

As you know, the state of charge in these batteries is indicated by the three coloured balls. When they're all up the charge is up, when the battery is 25 per cent discharged the green ball sinks. When the cell

is 50 per cent discharged the white ball disappears as well. When the red ball takes a nose dive—the cell is 75 per cent discharged. Sometimes the little balls stick and when they do you're liable to be fooled so if you see muck and sediment through the window of the cell you've got to do something about it.

The first thing to do is charge the battery. Charge it at a 2 or 3 amp rate until it bubbles freely for at least two hours. Next, you add electrolyte to raise the level three-eights of an inch above the level line on the side of the cell. Now you replace the filler cap and—holding your finger over the vent hole—shake the battery like you would a cocktail shaker. This will loosen the muck. Next you empty the electrolyte out and fill it with fresh electrolyte 1.275 specific gravity and give the battery another shaking. After doing this operation two or three times—like you would when you wash out a milk bottle—you'll get rid of most of the sediment. Then you wind up the job by filling the cell to the level line with 1.275 electrolyte and wipe off the outside of the case.

Here's answers to a few of the headaches the Sarge found in his mail-bag this month—Have **you** got any pet troubles you want to share with the Sarge?—Where you'll be thirty years from now—or where your last months pay disappeared to etc. etc. Strictly speaking, he only answers personal questions on his own time but if you have any technical maintenance problems write to Sarge O'Sweat—Cam Magazine, Directorate of Mechanical Engineering, Dept. of National Defence, Ottawa.

This is the **only** time when you add acid to this type of battery and the battery must be in a fully charged condition when you do it. At all other times you only add distilled water to bring the electrolyte up to proper level.

I hope this answers your question Sarge—but if you have any more questions on the subject shoot 'em along.

O'Sweat

Dear Sarge O'Sweat

Could you please tell me why the Harley-Davidson Solo 45 Motorcycles go into a speedwobble at anything over 60 mph.?

Are they improperly balanced, or is the fault the riders?

Sgt. S.B.

Dear Sgt. S.B.

Did we hear you right? "Over 60 mph"—and we **know** that you know that 40 mph is the army's speed limit for m'cycles.

However, looking at the matter as a purely technical problem there are several "whys". The most likely one of them all being tied in with the use of the **steering damper**. Its main purpose in life is to prevent wobble at higher speeds. It should and will do this job when you tighten it by moving the operating lever to the right. What happens is simply the application of pressure to a set of friction disks which in turn act as

a shock absorber on the steering head.

Dirty or greasy friction disks—improper adjustment of the actuating sleeve and adjusting nut, can leave you without the benefits of the steering damper. Possible results: a wobble, particularly on unevenly surfaced fast curves.

From there a less likely list of causes can be expanded to considerable length. A wheel rim out of true (it should run within 1/16" of true) might cause trouble—too much wheel "shake" due to loose wheel bearings—bent or misaligned forks, frame or rear wheel—worn or badly adjusted steering head bearings—or just poor riding.

Take our word for it—the motorcycle is O.K. for its intended use when issued but remember they didn't issue it for racing. Things like auxiliary tool boxes, front stands and extra lights don't contribute to top speed handling on any machine—but everything being in proper mechanical order, and the steering damper in operation—you'll get no wobble. We had none when we road-tested these jobs at everything on the clock.

Introduce your boys to the steering damper—sargeant.

O'Sweat

Dear O'Sweat:

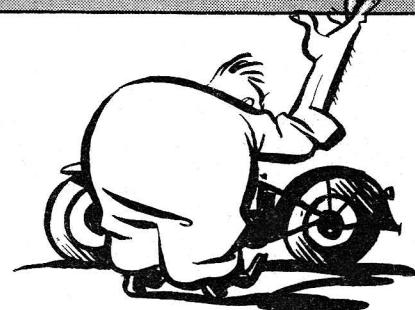
I've got a little problem I'd like to get off my chest. We've got quite a few motorcycles here and very often one comes in missing pretty badly. We usually find the trouble in the coil. It seems that the high tension leads from the coil to the plugs very often split or crack just where they emerge from the coil.

We've tried all kinds of dope to seal the cracks, such as—shellac, gasket goo and what have you. Nothing seems to work very long. Although the coil is good, we usually have to replace it with a new one just on account of these cracks in the leads. (Continued on page 40)



Hard to get—they sure are. But here's a way you can salvage some of the old ones.

WE received a letter not long ago asking if there was any way to stop the leak in the spark plug wires of motorcycle coils. After nosing around like a well trained spaniel we found out there's a lot of trouble in getting a supply of new coils for these machines. That makes it all the more important that as many of the old coils as possible are put back into service. At first glance you might think the high tension wires are part of these coils—just like a stem is to an apple, don't be fooled though—the wires will come out and new ones can be put back in. If you know how to do this simple little job you can make lots of old coils just like new and believe us—if you had to pay for a new coil you'd see why they are worth saving.



Before you do anything else, procure the new cable and get it all ready to install. Trim one end, and round the corners and edges of the insulation so the cable can be slipped into the coil easily. If you do this part of the job properly it'll save you a lot of cussing and fuming later on. An illustration of how the wires should be trimmed is shown in Fig. 1.

To get the old cables out you have to warm the coil slightly. This softens the sealing pitch and makes it easy to pull out the cable. Hey you—put down that blow torch, we said heat the coil **slightly**—not start a bonfire. The way to heat the coil without damaging it is just run battery current through it for ten or fifteen minutes. The coil should draw 4 or 5 amps when it's connected up to a six volt battery. The battery current can easily be run through the coil by closing the ignition switch or by connecting the coil terminals to any six volt battery. The current flowing through the windings of the coil will cause sufficient heat to soften the pitch. When the coil is warm (not hot) unscrew the cable seal nuts and pull out the old cables carefully. After you get the cables out—transfer the nut, steel washer and rubber pack-

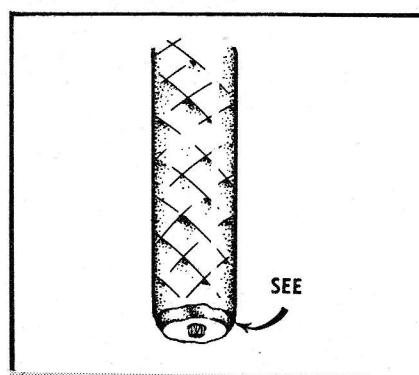


Fig. 1. Making a slight chamfer like this will allow the new cable to be pushed into the coil easily. A little bit of lubrication will make it easier still.

(Continued on page 37)



If it's lead—milk won't fix you.
Come off that stuff and take the
pledge the right way.

HERE'S Fatso for example, we met him the other day during a break period. There he was, sitting in a corner surrounded by milk bottles and doing his best to kill two more quarts before the whistle blew.

Fatso evidently is one of those guys who had a mother that told him everything—well almost everything. It seems that before turning her fat little boy out in the world she told him to drink lots of milk. That's good—but how did she know he was going to become a spray painter? And if she had known, we wonder if it would have made any difference to the advice she gave her little 200 pound son.

We know lots of painters (whether their mothers told them or not) who think they ought to drink a couple of quarts of milk every day. Like many more old fashioned cures, this idea has been handed down from one painter to another for years. The idea behind it is that the milk is supposed to counteract the lead ab-

sorbed in the system. This doesn't just apply to painters either. Battery men and welders are included in this group, in fact anyone who is in contact with lead or breathing fumes which contain lead.

Right now we're going to tell you that this **excessive** milk drinking is bad. It's like taking aspirin for a toothache. If you have a bad tooth and take an aspirin instead of going to a dentist what happens? The toothache vanishes, you then proceed to forget all about it until the next time it aches. Another aspirin and you forget it again. After a while the aspirin doesn't do any good so in the end you have to go to the dentist anyway. By that time the tooth is so far gone it has to come out. See what we mean about the milk—it acts like the aspirin, it hides the trouble temporarily but it doesn't really do you any good as far as killing any of the lead you've absorbed in your system. As a matter of fact the calcium in the milk acts like a sponge—it allows your system to absorb a heap of lead at the same time hiding the symptoms. If your work exposes you to lead

there are certain things you can do to avoid lead poisoning but drinking milk by the quart or gallon isn't one of them. We aren't trying to stop your from drinking milk—don't get us wrong. What we do mean—is not to drink milk with the idea that it's a safeguard against poison. We aren't trying to scare you from your job either—you'll probably live longer than we will. But if you want to feel in the pink all the time—here's a few things you might remember.

Lead poisoning is bad medicine, you'll know that if you've ever been a victim. When traces of it get into your body it may affect your stomach. You may have indigestion or just a plain belly ache. This is sometimes known as "Painters Colic". On the other hand, you may find it affects your blood and you'll have anemia which is a shortage of "red corporals". The Sarge often suffers from this only he has too many of 'em. Another result of lead poisoning is its affect on the nerves. The Doc's call it "Paralysis"—we call it just plain lead in the pants. You'll know this feeling if your arm muscles or hand grips aren't as strong as they used to be.

Now here's something else you should know. Lead can enter your body in several different ways (not counting papa's shot-gun). You can inhale it by breathing in dust containing particles of lead or it can enter your body through your mouth. We know you aren't going to take a chaw of lead every so often but—do you ever eat with dirty hands? If you do you're bound to swallow some of the dirt and grease on your hands and particles of lead along with it. Biting your fingernails is another excellent way to get lead poisoning, so—if you happen to be the nervous type—bite someone else's nails who doesn't work in a shop.

Some carburetor men swallow lead (in very small amounts) whenever

MOTORCYCLES

(Continued from page 35)

ing washer to the new cable. Make sure you install the rubber washer on the cable so the cone shaped end of the washer will face toward the coil. If the washer isn't put on this way water may enter the coil. Now measure the depth of the holes in the coil with a piece of stiff wire. This will tell you how far the new cable has to go into the coil. Mark the depth of the hole on the new cable and dip the end of the cable in some light oil. This will allow it to slip into the coil nice and easy and that's what you do next.

The pitch will still be warm if the noon whistle hasn't blown in the meantime. Make sure you insert the new cable all the way down in the hole—you can tell when it's down by the mark you made. If the cable isn't all the way down there'll be a nice little gap left which the spark will have to jump. This arcing inside the coil will damage the coil beyond repair in a short time—you wouldn't want that to happen would

you—especially when these coils are so hard to get.

After you have the cables in place the only thing left to do is tighten down the terminal nuts. Now you'll have a motorcycle coil that's better than new.

We've shown in Fig. 2 what the internal connections look like so after you ponder over this diagram for a moment or two you'll have a rough idea of what you're up against before you go pulling wires out of unsuspecting coils.

One more point to remember (and this is what makes your reconditioned coil better than the original) when you install a new pair of high tension wires—make them about two inches longer than the old ones. By doing this you'll find they'll last longer without cracking because they won't require such a sharp bend at the coil end.

O.K.—now you can start rooting around for all the old Motorcycle coils and see if you can fix 'em.

x y z

POISONAL

they work on a carburetor. Lead treated fuel shouldn't **ever** get near your mouth—so whether you're blowing out a jet or syphoning a gas tank—don't use your mouth.

There's another way you can get lead into your system—and that's by absorbing it through the skin. Like we've already mentioned—paint, battery parts, gasoline and various metal alloys contain lead. If any part of your skin is exposed to lead, small amounts of it may be absorbed through the pores or open cuts. If you are handling any of these things often—wearing of gloves isn't being a sissy—it's just plain being smart.

Lead is absorbed by the body very easily and you can't get rid of it overnight like a hangover. In other words—if you absorb just a little bit each day—in six months or a year

you may store up enough to make you a sick duck. The thing to do then—if you're a painter or doing lead burning in a battery shop or welding or doing body work—is take precautions.

Make sure you have proper ventilation where you're working. Wash carefully before you eat your meals, clean under your fingernails too. (A brush is better for this job than a knife) Always wear a proper lead respirator when working where there's lead fumes. Don't forget your helper either—he may get more of the fumes than you if the wind's blowing the right way.

The army has a new type lead respirator ready for issue. It's easy to wear and is the latest fashion in safety. It's even called "Comfo" and you can indent for it through

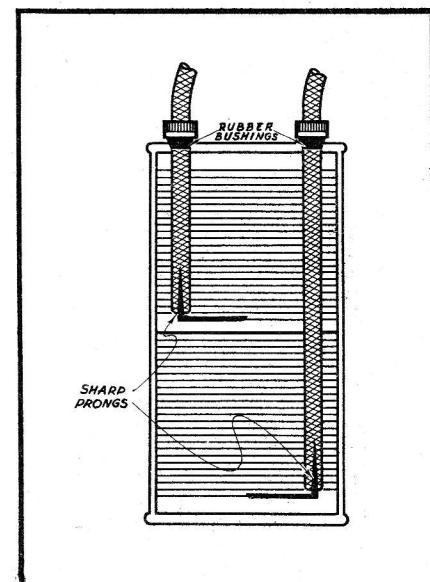


Fig. 2. This gives you a rough idea of how the high tension cables are connected inside the coil. Note the sharp prongs—that's why the cable has to be pushed right down. Also notice the different lengths of the cables.

"Spare Parts" Indent for "Comfo Lead Respirator" — part number 90506". For your own good—if you haven't got one—get one; and you know what to do with it.

There's one more thing you can do and should do. This is one time you can swing the lead legitimately. **Every three months** go to your family doctor for a check up, you'll find him at the M.I.R. any day in the week. The Doc' will be glad to test you for lead content and if you're 99 per cent overproof he'll tell you. From the simple check up he gives you, you'll know whether the daily precautions you are taking are proving effective.

Well there you have it. Just remember—"an ounce of prevention is worth a pound of cure"—or—"a pound of lead and you'll be dead"

x y z

Contributions

Do you know how to make maintenance easier? We're asking you. Maybe you've got a better way of doing a job—perhaps a new trick for your trade.

If so, write CAM and let the rest of the boys in the field in on it.

Jeep Windshield Brace

ON both extremities of our land two minds were working with but a single thought back last summer.

Bomb. A. Cullin, R.C.A. in British Columbia and Pte. J. L. Scarlett, R.C.O.C. in Nova Scotia were both concerned about Jeep windshield frames breaking. We can just picture them—each meditatively sniffing their respective Atlantic and Pacific breezes in search of a solution.

Evidently the salt air's tonic effects were equal, for both hit upon the same prescription.

Our artist quickly whipped this prescription into the picture you see here with the aid of the sketches supplied by the originators.

The idea is simple and calls for no elaborate metal work—nor does it affect the normal folding of the windshield. You may find it more convenient to modify the construction details a trifle to suit your own particular facilities.

Over in the Proving Ground they slipped a set of these braces onto a Jeep last summer and let them ride for 6,000 miles of tough going. Verdict—O.K. No more trouble with a chronic windshield frame buster.

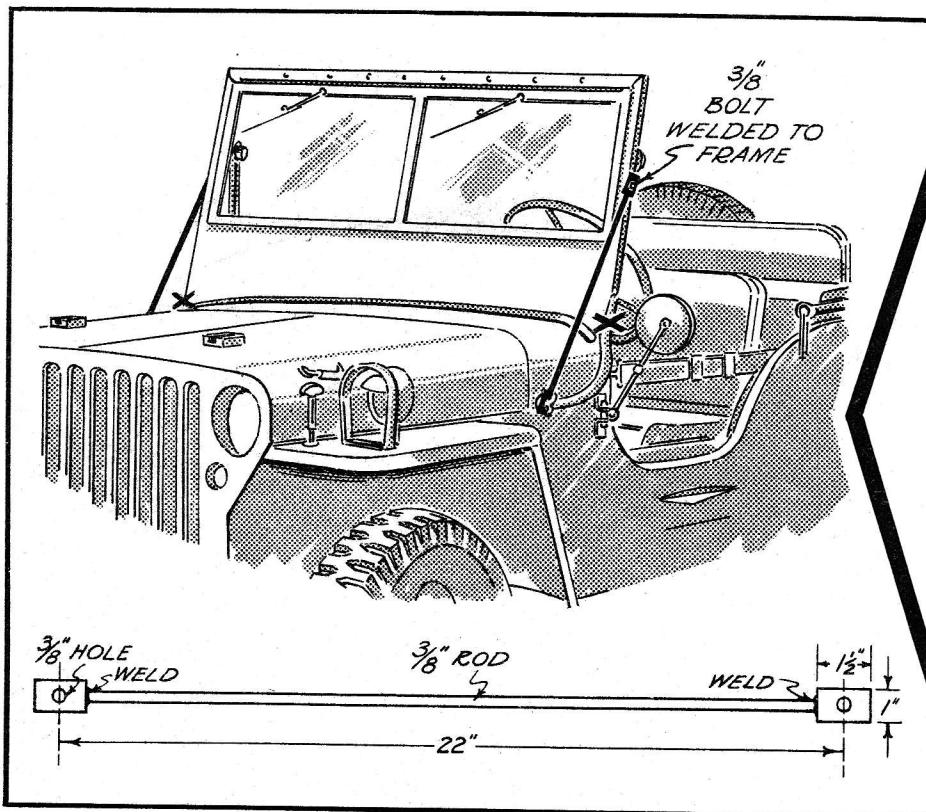
Motorcycle Filler Plugs

Here's a suggestion that was handed down from the motorcycle boys at Borden.

As you know—some changes have been made to the filler plugs on the Harley transmission to prevent the transmission filler necks from being broken. The filler plugs were first replaced by a shorter type so they wouldn't stick out like a Durant's nose and be knocked off. Then a special gasket was added (spare parts No. D.N.D. 90528) to prevent the plug from being jammed tight in the case.

The boys at Borden suggested cutting the hex head off the plug and then cut a screwdriver slot in the plug with a hacksaw. When this is done there's little chance of the plug being tightened too much because you've just got to use a screwdriver whether you want to or not.

There's an idea fellers—you can take it or leave it.



X marks the spot where the windshield frame tended to part.

The brace is made from a piece of $3/8$ " round rod $20\frac{1}{2}$ " long. Onto each end weld $1\frac{1}{2}$ " x 1 " x $1/8$ " plates containing $3/8$ " holes in their centres. Slip one end of the brace onto the lower pivot bolt of the windshield and accurately mark the spot on the upper part of the frame where you will weld the $3/8$ " bolt. Take care where you point the torch while doing the welding job because you'll be working pretty darn close to the windshield glass. Make sure that the rods fit snug. If they're loose they won't eliminate the vibration that's causing the breakage.

Forms in Folders

Dear Editor,

The following is an idea you may care to pass on:

General experience has been that documents, forms, etc. that are put in a vehicle for any length of time become dog-eared, greasy, moth-eaten and generally illegible. This was the fate of accident reports and witness cards we placed in our vehicles—the result of not being used.

To overcome this I looked around for a suitable folder to hold these forms and cards. The most satisfactory arrangement found was the cover of the old standing orders, remember the ones with two pockets, now obsolete and taking up space in the cupboard? An MFM 796 in one pocket, three witness cards in another and a piece of gummed paper on the outside with a notation of the contents was a handy addition to each of our vehicles.

I hope you will find this contribution to be of value.

(D. Arthur) Captain,
2nd (R) Bn Lake Superior Regt CA

Working along the same lines, we direct our gentle reader's attention to the article on Accidents in this issue wherein we propose a similar idea for keeping the accident reports and witness cards off the floor of the cab—only we suggested the standing orders folder that you're using right now. We got to bubbling over with ideas along this line as a result of the Capt's letter—why not add a couple of M.F.M. 211's (Design defect Reports) to your bundle and keep them altogether. In this way you're fully equipped to record the facts and figures of come-what-may. Choose your folder, soldier.

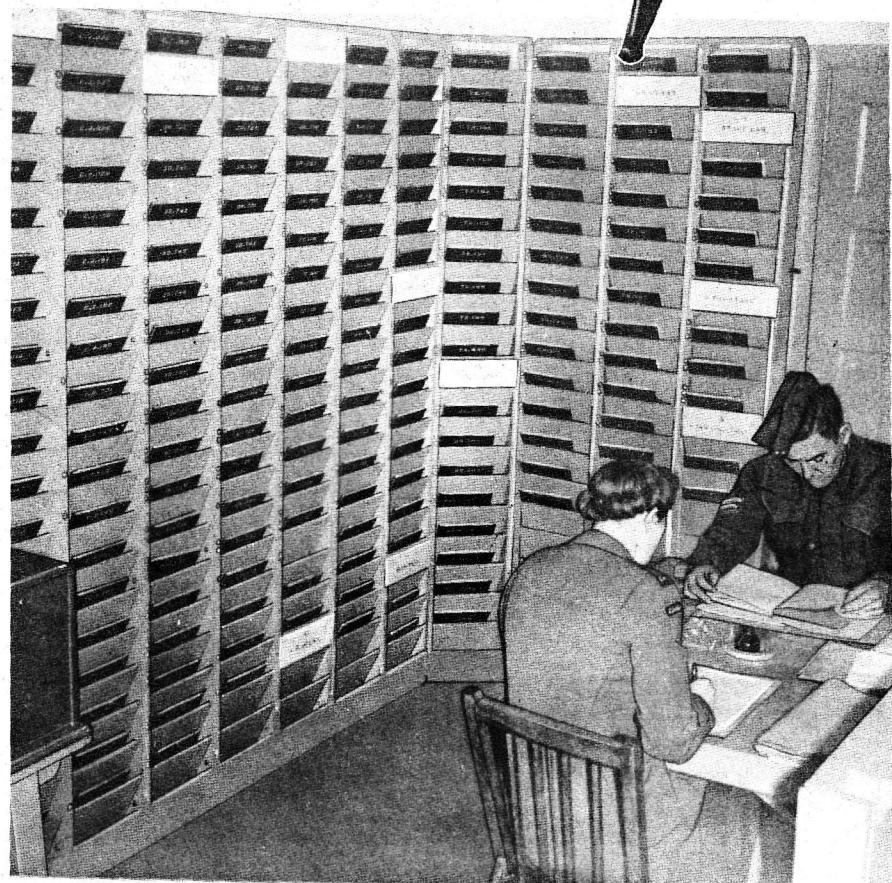
(Ed.)

Bigger and Better Control Racks

BACK around last April we ran a little story on control racks for use by unit garages and such like places. Since then we've been hearing from up and coming outfits all over the country on how **they** went about doping out their control rack ideas. Here's a couple of snaps that fell into our hands showing two of the neatest jobs.

The Duncan-Fyfe model is in operation at No. 7 District Coy. R.C.A.S.C. St. Johns N.B. and was built by the R.C.A.S.C. M.T. Shop there.

The wall job can take care of nearly 200 vehicles and is the R.C.E.M.E. in M.D. 6's idea of doing a job right. (the Corp and the C.W.A.C. just put away their cribbage board to make the picture look good).



THIS is a true story.

It originated as a report by an R.C.A.S.C. Tpt. Pl. Commander after some off-the-road operations in B.C. with his flock of Ford 60 cwt. T.C.Vs. (of which he says very kind and complimentary things).

Evidently the Lieut. didn't spend all his time chasing butterflies for his collection, or writing scented notes to his patootie about nature in the uncooked state.

Not that he didn't have plenty of nature (raw) to contend with—along with his flock of trucks. Thrown in was a varied assortment of weather, terrain and the usual quota of daylight and darkness. Roads were called roads out of sheer politeness and in most cases consisted of a cleared strip through the trees. That is—when they consisted.

In the face of these things, however, our hero and his boys didn't hide in the bushes and sulk. Instead they spent their time gathering savvy on this type of operating. Thus, it came about that before they arrived back at home base there had been some changes made—both to vehicles and ideas.

First off, it was found that a lot of unnecessary damage could be prevented by stripping easily bent and weak parts from the lorry such

O'SWEAT—(Continued from page 35)

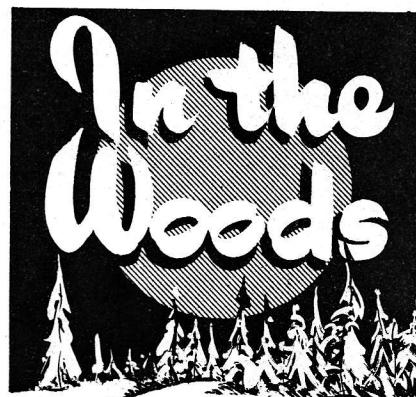
Can you give me a bit of information on how to overcome the appearance of these cracks and also how to repair them.

Tpr. E.J.P.

Dear Tpr. E.J.P.:

First I want to thank you for bringing up such an important matter as salvaging motorcycle coils. As you probably know, these coils are pretty darn hard to get right now so a lot of the boys will no doubt be interested in getting a little dope on how to put the fix on them.

I though it was such an important



as petrol can carriers, side clearance lights, mud flaps, loose tar-paulins and locks.

The mud flaps and clearance lights weren't found to be contributing anything in this type of going—and were invariably being snapped off or bent. Locks were in the same boat. They were removed and replaced with wire.

During the wet period the ruts eventually became so deep that the vehicles would go down over the hub caps. When it came to de-ditching, it was found that the two tool carriers caught on the ground—making the job that much tougher. So off they came and were carried in the box—along with the extra petrol and oil supply.

Having found a few things he could do without there also appeared

item right at this time I dug up enough information to put into an article in this issue (page 35). After you read it you should have the answer to your question. One of the reasons why these cables crack like they do is because they run pretty close to the cylinders which cooks the insulation. Another reason is the bend in the original cable is too sharp—a little longer cable then will allow a bend that's more comfy.

If you've got any more troubles let us know because that's the kind of stuff we thrive on.

O'Sweat

to be some items that could definitely be done with.

One of these was a good axe or hatchet. The necessity of corduroying strips of road made this an essential part of the driver's equipment. Also they had to frequently make or repair bridges. Nails and stakes are top needs here. Attempts to make log bridges without nails usually meant trouble as the 3-ton trucks "rolled them up"—particularly as it was usually not possible to make a direct approach. Ordinary commercial tires without chains rendered a truck more or less useless in the tough spots. Chains were used often on the plain tread jobs. Traction tread tires gave adequate grip.

Another "find" was that it didn't pay to send vehicles out singly, as much time was lost if they became stuck in waiting to get pulled out. Trucks operating in pairs could often pull each other out. In this connection a chain or rope and pulley to help in overcoming indirect pulls was thought of as a mighty helpful addition.

Night operation in thick bush proved unsatisfactory. It was found that more time and grief was saved by bivouacking when darkness came and pushing on again when there was daylight.

Finally it was proved that maintenance can be carried on satisfactorily under these conditions—provided C.P.M.S. 1, 2, and 3 is completed daily to catch anything about to go astray.

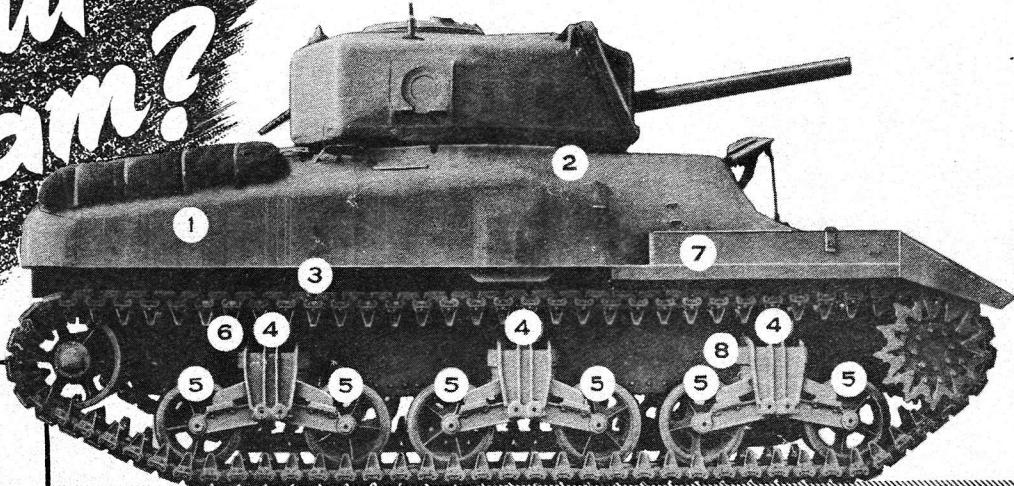
As we said—this is a true story. We pass it on exactly as we got it from the lads who did the trip because it sounds like useful and practical dope.

Maybe some of you old hand "schemsters" can add or subtract from it. You know our address.

* * *

Aug 4 1944 1981-597/56

How's your Ram, Sam?



THE thirty odd tons of fightin' metal known as your Ram Tank has had some changes made to it since it first rolled off the assembly line. Or maybe we're jumping at conclusions—maybe you haven't got around to it yet—but you should have.

Up till recently you've been receiving all your modification dope in what was called "modification bulletins". In future you'll be getting it in another form, "Calemei's"—spelled C.A.L.E.M.E.I. Don't let that throw you—it stands for Canadian Army Local Electrical and Mechanical Engineering Instructions. The word "Local" in there means they apply only in Canada.

Now here's the setup on your Ram—Sam. We got up before breakfast the other morning and made a list of all of the most important modifications. Any of the old Modification Bulletins that we haven't shown here you can forget about. Those that are shown here are a must. We've shown the Modification Bulletin number along with the Calemei number. All you've got to do is check your Ram with this list and if it's up to date—that's jake, you can go back to bed. If it isn't up to date—slip into your socks and see that the jobs are done as soon as possible.

1. PROTECTIVE SHIELD FOR AIR INTAKE PIPE.

Modification Bulletin No. 24.

C.A.L.E.M.E.I., Tracked Vehicles J-257, Instruction 4.

Without the shield the tape will cook, letting the asbestos fall off the air intake pipe and that's bad for carburetion.

2. IMPROVED TURRET LOCK

Modification Bulletin No. 25.

C.A.L.E.M.E.I., Tracked Vehicles J-257, Instruction 5.

A lock that doesn't stay locked can cause gobs of trouble—that's why there's a new and better one for your Rams.

3. THERMOSTATIC BY-PASS VALVE FOR OIL COOLER.

Modification Bulletin No. 27.

C.A.L.E.M.E.I., Tracked Vehicles J-257, Instruction 2.

The old type of spring loaded by-pass valve isn't worth a hoot in the cold weather so you better make sure your Ram's got the bellows type.

4. TRACK SUPPORT ROLLER SPACERS.

Modification Bulletin No. 29.

C.A.L.E.M.E.I., Tracked Vehicles J-257, Instruction 3.

Rams without offset roller brackets need breathing space for the rollers to stop them from seizing. Ram's with offset roller brackets need a spacer to prevent excessive wear on the track skids—better look into this Sam.

5. BOGIE WHEEL TIRES.

Modification Bulletin No. 31.

C.A.L.E.M.E.I., Tracked Vehicles J-017, Instruction 2.

The side walls of the bogie tires should slope inwards. If those on your Ram are straight they've got to be trimmed so they'll last longer.

6. RUBBER PACKING RING ON SCAVENGER PUMP HOUSING.

Modification Bulletin No. 37.

C.A.L.E.M.E.I., Tracked Vehicles J-017, Instruction 3.

Sometimes an oil leak develops around the front of the scavenger pump. To stop this baby from leaking you've got to dress it up with rubber pants.

7. ELECTRICAL OIL RECORDING UNITS.

Modification Bulletin No. 40.

C.A.L.E.M.E.I., Tracked Vehicles J-257, Instruction 1.

The mechanical type of oil temperature and pressure gauge is out. If you haven't got the electrical type on your Ram now—you'd better get it on, but quick.

8. TRANSMISSION GEAR SHIFT ROD POPPET SPRINGS.

(This is a new one). No Modification Bulletin.

C.A.L.E.M.E.I., Tracked Vehicles J-014, Instruction 1.

You didn't see a modification bulletin about this because there wasn't one. You'll find all the dope in the Calemei and it's important if you want to get your Ram properly in gear.

Speaking of PIN-UPS-

Tsk-Tsk—that's not what we meant when we asked our artist to illustrate a Pin-Up. We were thinking of an idea that some units are using to help CAM get read by all hands. They found that this magazine goes out of circulation too soon when some fast-fisted wrench-slinger fastens on to a copy for keeps—doesn't pass it to the next fellow when he's read it. Besides going after these "finder's keepers" lads and getting them to play ball, these units evolved the Pin-Up. There are a couple of methods used. Some remove the staples from a couple of CAMS and pin up the pages, in order, on a board—like a large notice board. When a new issue comes out, the pages can be taken down and made into a loose leaf "back number" book. Other units use the binder idea alone. A copy of each issue is placed in a binder—or binders—which are hung in strategic spots handy for all to get at. Both Pin-Up ideas help to give everyone a chance to see every issue—and were just conceited enough to think that they want to.

